

Wisconsin Coastal Zone Management Program

# HARBOR STUDY

## Cost/Benefit Components

### Scope of Study



COASTAL ZONE  
INFORMATION CENTER

JULY 1989

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## **BAY-LAKE Regional Planning Commission**

*serving communities within the counties of:*

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HARBOR STUDY  
COST/BENEFIT COMPONENTS  
SCOPE OF STUDY

U.S. DEPARTMENT OF COMMERCE NOAA  
COASTAL SERVICES CENTER  
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July 1989

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The preparation of this study was financed through a contract between the State of Wisconsin, Division of State Energy and Coastal Management, Department of Administration, and the Coastal Zone Management Improvement Act of 1980, as amended, administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration; the Bay-Lake Regional Planning Commission, and the Brown County Harbor Commission.

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## FORWARD

The Wisconsin Coastal Management Program was established in 1978 to direct comprehensive attention to the state's 820 miles of Lake Michigan and Lake Superior coastline. The WCMP analyzes and develops state policy on a wide range of Great Lakes issues, coordinates the many governmental programs that affect the coast, and provides grants to stimulate better state and local coastal management. Its overall goal is to preserve, protect and develop the resources of Wisconsin's coastal areas for this and succeeding generations.

In April of 1989, the Bay-Lake Regional Planning Commission and Brown County Harbor Commission in cooperation with the Wisconsin Coastal Management Program contracted to complete the following project: to identify cost-benefit components associated with harbor operations to assist in the development of a scope of study; to develop a scope of study that can be evaluated to determine the true benefit/cost of the Port of Green Bay including the potential for relocation of the existing shipping interests to other harbors in the region; and, to prepare, if requested, the necessary Requests For Proposals for consultant selection to conduct such a study.

HARBOR STUDY STEERING COMMITTEE  
BACKGROUND PAPER

The impetus for the harbor study need came from local, regional and state concerns that a model or method of accurately measuring the economic viability of port operations be developed and utilized for the Port of Green Bay and be applicable to other port operations throughout the state. The Bay-Lake Regional Planning Commission and the Brown County Harbor Commission established a Harbor Study Steering Committee to address this issue.

The Committee is comprised of representatives from city and county government; private industry; local, regional, state and federal agencies; harbor business and industry users; and, natural resource and environmental interests. The Harbor Study Steering Committee will identify cost-benefit components and issues to provide direction to the development of a scope of study for economic viability. Issues identified by the Committee are not meant to be all-inclusive but rather, provide a base for the study development.

A listing of cost-benefit components was defined by the Committee through the use of the nominal group process. Three groups of committee members identified quantitative as well as qualitative issues, to be addressed in future study endeavors.

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## STUDY INTRODUCTION

## Introduction

In January 1989 the Bay-Lake Regional Planning Commission and the Brown County Harbor Commission initiated a study effort to identify cost and benefit components impacting commercial harbors within the northeastern Wisconsin region and compare these harbor cost/benefits with the relative cost/benefits of alternative transportation means, such as truck or rail for transporting the same goods; or the relative cost/benefits of improving nearby harbor facilities for transporting the same goods.

To assist in the identification and development of such a study the Bay-Lake Regional Harbor Council, consisting of representatives of the harbors within the region and additional representatives from public and private interests were convened to address the issue. (Appendix A lists the membership of the Harbor Study Steering Committee).

The goal of the Harbor Study Steering Committee is to develop the scope of a cost benefit study needed to determine the long-term feasibility of any commercial port operations, and to apply the results of such study to the specific Port of Green Bay.

The initial meeting was held January 20, 1989 and the committee, utilizing the nominal group process, identified costs and benefit components that impacted ports within the Bay-Lake region and throughout the state. Table 1 identifies the major categories and the main cost and benefit components identified by the committee.

The process itself is structured, and is organized in a nominal-round robin-interacting-nominal group sequence. These events, in this order, provide participants time to think and search out their minds, a chance to share and discuss their ideas equally with others and an opportunity to make

Table 1

## HARBOR STUDY COMPONENTS

Major Categories	Main Cost Components	Main Benefit Components
Dredging/Disposal	Dredge/Disposal Long term care disposal facility Legal aspects fed/state/local	Receipt of Federal Funds
Environmental	Impact Costs Wildlife Federal/State enforcement Social Seasonal CDF Cost	Environmental Benefits Improve Environment Image
Business/Economic	Employment Water Quality Enforcement Alternative Ports Port Promotion National System Impact Social	Jobs Economic Development Reduced Transportation Ship Expenditures Economic Multipliers Image
Recreation	Conservation Enforcement Lost Opportunity Opportunity Social	Opportunities Dredging Cultural
Public/Private Infrastructure	Facility Alternative Ports Property Assessment Port Promotion Enforcement Use of City Land Length of Season Lost Opportunity	Infrastructure Benefit/Stability Other Mode Upkeep Area Required Safety

independent decisions. The nominal group process is most advantageous in that it provides an atmosphere for independent thinking, tolerates conflicts in ideas, depersonalizes the ideas presented, provides focus on important issues, and encourages minority opinions as well as majority opinions. (Appendix B contains the initial listing of the January 20, 1989 nominal group session).

#### Major Categories

Subsequent meetings of the Harbor Study Steering Committee have resulted in grouping the cost/benefit components under the following major categories: (Each component should have equal merit in the study effort and the list of categories should not be viewed as listed by priority.)

- . Dredging and disposal
- . Environmental
- . Business and economic
- . Recreation
- . Public/Private infrastructure

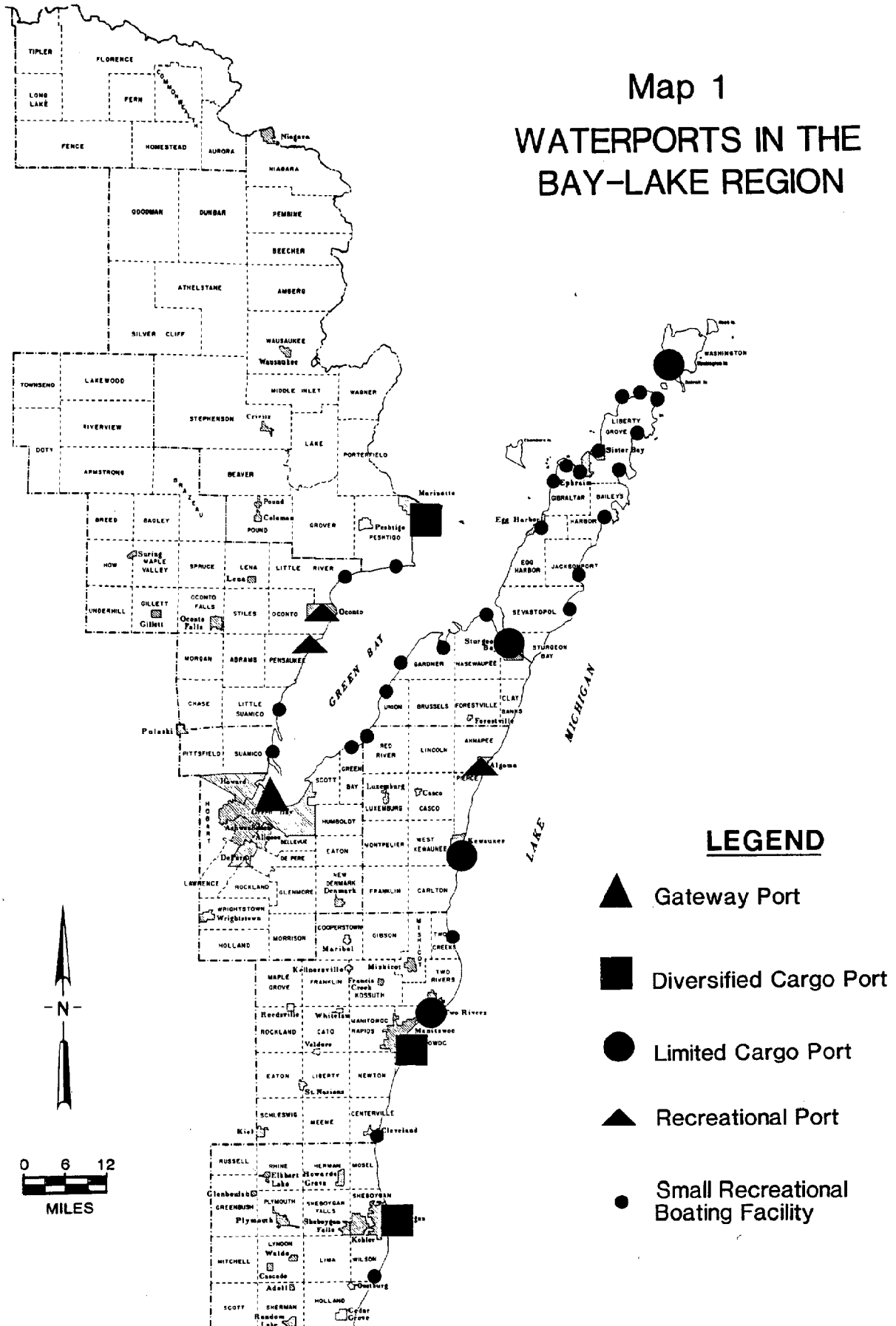
Under each category, specific cost components and benefit components have been further identified to include all the concerns of the Harbor Study Steering Committee as significant to the costs and benefits of commercial port operations. (Appendix C lists the major categories and the specific elements under each category).

#### Scope of Study

The question to be addressed is: Are there alternative routes and facilities that could deliver these goods and services more efficiently or is the port the best alternative? The following elements identify the scope of study needed to accomplish a cost benefit analysis determining the long range feasibility for the Port of Green Bay, Wisconsin.

- . Cost components presented by major category including a discussion of the specific components associated with the port, alternative transportation modes, and alternative port(s) locations.
- . Benefit components presented by major category including a discussion of the specific components associated with the port, alternative transportation modes, and alternative port(s) locations.
- . A summary of the Harbor Study Components, listing major categories, main cost components and main benefit components including primary and dependent influences for which detailed specific cost estimates to conduct the study will be requested.
- . A definition of the geographic study area (see Map 1 and Map 2). The immediate area served by the port includes Brown County, Wisconsin and the communities of northeastern Wisconsin as well as the communities in the Fox River Valley.
- . Preparation of a cost/benefit analysis of the port of Green Bay utilizing alternative transportation modes and alternative port(s) locations as inherent scenarios in the study methodology.

# Map 1 WATERPORTS IN THE BAY-LAKE REGION

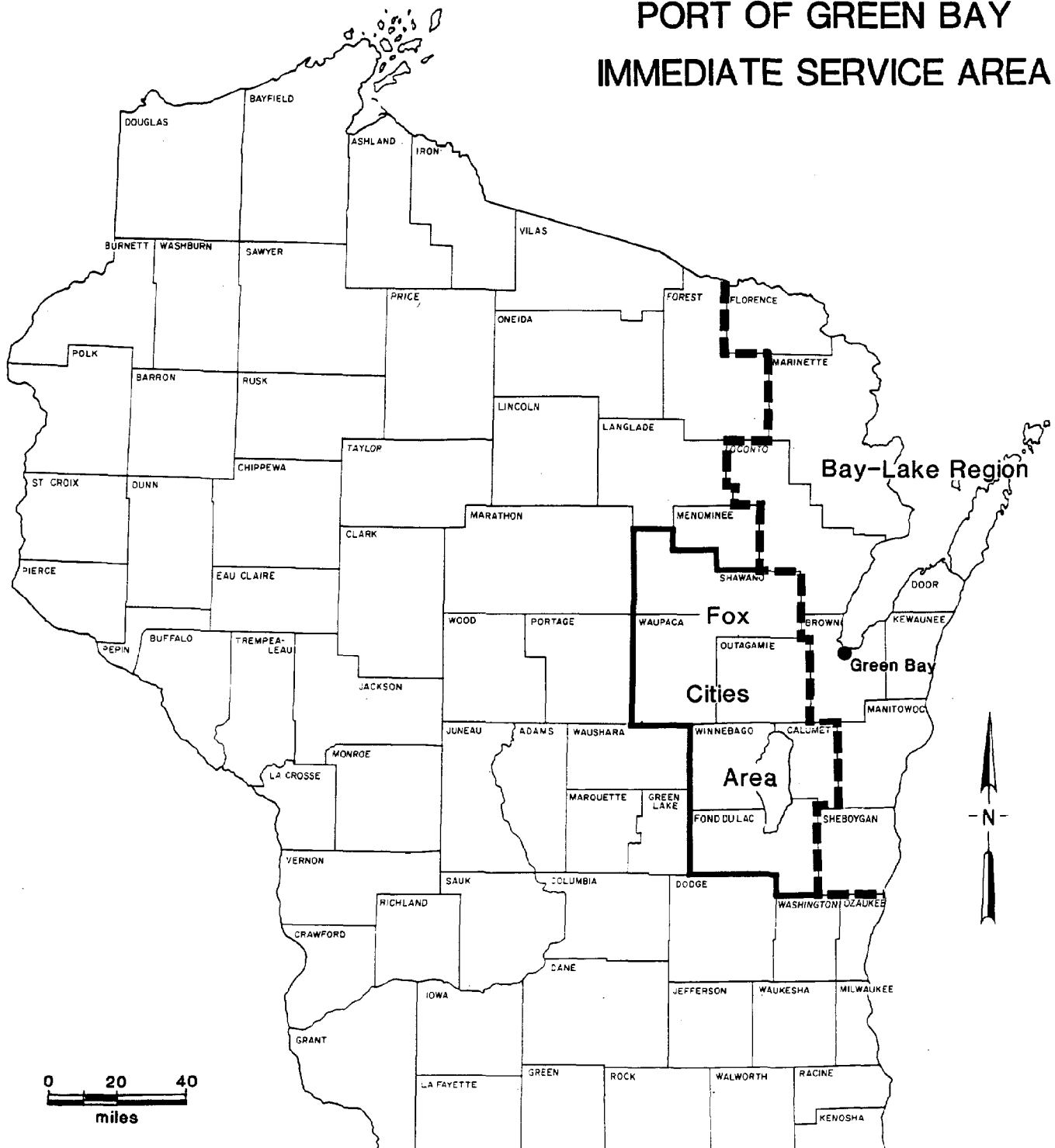


SOURCE: Wisconsin Department of Transportation, BLRPC 1989.

# Map 2

## PORT OF GREEN BAY

### IMMEDIATE SERVICE AREA



HARBOR STUDY  
COST COMPONENTS



## HARBOR STUDY COST COMPONENTS

### DREDGING/DISPOSAL

Cost components in this category include the direct annual costs of dredging and disposal of sediment to maintain a water navigation channel.

#### Dredging/Disposal

- . To include the local, state and federal costs of planning, engineering, and permitting necessary for dredging to occur whether dredging is performed through hydraulic or the conventional mechanical method.
- . To include the costs of operation and maintenance dredging including, any new work which may have to be completed.
- . To include the administrative/management costs associated with the operation of dredging.
- . To include the cost of removal, decontamination and disposal of existing contaminated or non-contaminated sediments, legally a solid waste in Wisconsin, which must be enclosed in confined disposal facilities or other approved disposal sites.
- . To include the cost for siting, design construction, and maintenance of dredge material containment sites so as not to incur storm damage.
- . To include the costs of upland disposal activities versus in water disposal activities as it relates to licensed or unlicensed requirements of the Wisconsin Waste Management Fund.
- . To include the additional energy costs, road costs, and community costs for disposal at upland sites.

- . To include alternative costs of site development, dredging, and sediment disposal i.e. (quantity of materials to be handled at alternative commercial harbors in the region).
- . To include the costs of private dredge disposal and remedial action dredge disposal.

#### Long Term Care of Disposal Facility

Cost components in this category include community costs related to the maintenance and operation of a confined disposal facility.

- . To include the environmental and economic costs associated with any storm damage incurred by a confined disposal facility.
- . To include the cost to local government for the use of city space, materials and staff time in the development, operation and maintenance of a confined disposal site.

#### Legal Aspects/Federal/State/Local

This category of cost components considers the costs associated with legal requirements which are imposed by local, state and federal units of government.

- . To include the enforcement costs of sediment disposal, legally designated a solid waste, and requiring a solid waste disposal facility.
- . To include the cost of upland and in-water disposal sites as provided by Federal, State and Local regulations and enforcement.
- . To include the cost of enforcement of Federal and State water quality regulations.

## ENVIRONMENTAL

Cost components in this category include environmental impact costs and environmental enforcement costs associated with dredging to maintain a water navigation channel.

### Environmental Costs

- . To include the environmental impact costs and enforcement costs associated with dredging and disposal of dredge sediments.
- . To include the costs of potential damage to the air, water and land environments.
- . To include additional environmental/pollution costs associated with dredge disposal at remote disposal sites or disposal sites requiring sediment routing through sensitive environmental corridors.
- . To include the costs associated with clean-up of ground water degradation from the confinement of dredging sediments.

### Wildlife

Cost components in this category include those costs associated with dredging operations and fish and wildlife habitat.

- . To include the cost of any loss of fish and wildlife habitat or costs of restoration to partially damaged fish and wildlife habitat.
- . To include the cost of destruction and non-renewal of fish and wildlife habitat.
- . To include the health impacts upon fish and wildlife due to dredging operations.

- . To include the impacts of the introduction of unwanted species to the surface waters due to release of ballast waters by ships, or clinging to the ships hull.

#### Legal Requirements

This category of cost components was developed to consider the environmental enforcement costs associated with local, state and federal environmental regulations.

- . To include the cost of public agencies in the administration and enforcement of rules and regulations addressing reduction of industrial or municipal waste load allocations into the environment to conform with government regulations.
- . To include the cost of the development of additional local, state or federal environmental regulations.
- . To include the costs of enforcing air and groundwater pollution regulations which may be necessary due to pollution created through evaporation or seepage of contaminants at dredging sites or dredge material disposal sites.

#### Social Costs

Cost components in this category consider environmental pollution and its impact upon the local society.

- . To include costs associated with human health problems due to the environmental impacts caused by dredging and disposal of contaminated sediments.
- . To include the human impact costs due to resuspension of contaminants due to disrupting sediments during the dredging process.

### Seasonal Costs

Costs associated with this category include costs incurred as a result of the lengthening of the shipping season from 8.5 months to 10 months.

- . To include disruption to the land and water environment due to any ice breaking to maintain shipping lanes.
- . To include costs associated with a longer shipping season.
- . To include the economic and environmental costs of potential spills from ships and the costs associated with the materials/equipment; manpower/training required in case such a spill occurs.

### Confined Disposal Facility Cost

This category includes added environmental costs associated with the damages due to a one hundred year storm to an existing CDF causing leaking or contamination of surrounding environment.

## BUSINESS AND ECONOMIC

Cost components contained in this category include the economic impacts of dredging upon business, employment, and the international distribution system for port dependent industries.

### Employment Costs

This category includes costs associated with employment required to maintain a commercial port operation.

- . To include the cost of labor for shipping operations consisting of ship and portside facility labor needs.
- . To include the unemployment costs of seasonal labor.
- . To include the employment impacts associated with trucking and rail due to port operations.

### Economic Effects of Water Quality

This category includes the business and economic costs implicit in maintaining or improving water quality associated with more restrictive water quality rules and regulations.

- . To include any cost to business and industry for reduction of waste load allocations.
- . To include business costs associated with the possible loss to the commercial fishing industry due to the loss of either fish or fish habitat as a result of the dredging process or in-water dredge sediment disposal sites.

### Alternate Port Costs

This category includes costs associated with the loss of an existing commercial port to an alternate geographic area.

- . To include the economic and business costs associated with a decrease in commodity flows to an area due to the cessation of dredging operations at the existing port.
- . To include alternative transportation costs if current port operations are closed.
- . To include costs presented as costs per work week in terms of public taxes needed to support alternative forms of transportation.
- . To include lost economic development opportunity costs.
- . To include the additional storage cost of bulk commodities.
- . To include the costs associated with the price of transportation as a result of loss of competition.
- . To include the cost to study and/or develop alternative port sites and associated transportation alternatives.
- . To include the costs of initial investment to develop an alternate port site and the long term costs of port operations.
- . To include the costs of fuel and energy consumption associated with additional demands upon other transportation modes.
- . To include the cost of use of municipal and private space to store bulk commodities prior to transport by truck or rail.
- . To include trans-shipment costs.

- . To include the cost of lost export and import opportunities.
- . To include the costs associated with various ship size options currently available for shipping operations should dredging not occur.

#### Port Promotion Costs

This category includes the costs of promoting and marketing commercial port operations.

- . To include the administration, marketing, and promotion costs of the port authority as well as costs to Federal, State, and Local agencies and private interests in promoting port operations.

#### National System Impact

- . To include the cost of the economic impact to the national distribution system through disrupted regional port operations.

#### Social Costs

- . To include social costs to community as business and industry are affected by port closure.

### RECREATION

Cost components grouped into this category include those associated with recreation opportunities related to commercial ports.



#### Construction Costs

- . To include the costs to construct and maintain public marinas and recreational facilities should dredging not occur and commercial port operations cease.

#### Opportunity Cost

- . To include the lost opportunity costs for developing or improving recreation sites that are related to ongoing harbor dredging.
- . To include costs related to negative impacts of dredge sites and dredging upon existing and future recreational activities and area aesthetics.

#### Social Cost

- . To include social impact to community through reduced recreational opportunities as related to harbor operations.

### PUBLIC/PRIVATE INFRASTRUCTURE COSTS

Cost components grouped into this category include those related to the public and private infrastructure facilities necessary for the maintenance of commercial port operations.

#### Facility Costs

This category includes the cost of existing public and private physical facilities necessary for supporting a commercial port.

- . To include the cost of supporting transportation systems necessary for the distribution of goods imported and exported through a commercial port.
- . To include the public and private cost of equipment to operate and maintain a port. Such equipment would include bulkheads; erosion and flooding control structures;

breakwaters; navigational items; dock handling facilities; and waterside facilities and dockage.

- . To include the cost of special bridge structures, railroads and other transportation facilities needed to accommodate port operations.
- . To include the structural and general maintenance cost of the physical port facilities such as lift bridges, access roads and railroad maintenance.
- . To include the delay cost to motorists when a bridge is open or a train interrupts vehicle traffic.
- . To include the public infrastructure development and maintenance costs of sewer, water and roads necessary to support port operations.

#### Alternative Port Cost

This category addresses the potential physical relocation of one port operation to another geographic location.

Specifically addressing the costs of closing the Port of Green Bay and relocating the operations to another port location.

- . To address the cost of development of alternative ports.
- . To identify costs of initial investments and long term costs associated with relocation.
- . To include all feasibility study costs related to future harbor development.

#### Property Assessment Costs

This category includes the costs of property value linked to port facilities.

- . To include the cost of waterfront property value and taxes due to the existence of the port.
- . To include the cost in loss of property valuations and tax assessments due to the loss of port.

#### Port Promotion

- . To include the cost of maintaining a harbor commission and a port director.
- . To include the harbor management costs associated with promoting the local community infrastructure.

#### Enforcement Costs

- . To include costs of Federal and State regulations and enforcement upon port structure and operations.

#### Use of Community Land

- . To include costs of usable community land for dredge disposal.
- . To include costs of roadways and other community impacts for hauling dredged materials.

#### Lost Opportunity

- . To include lost opportunity costs to the community by not having a viable port operation available.

HARBOR STUDY  
BENEFIT COMPONENTS

HARBOR STUDY BENEFIT COMPONENTS  
DREDGING/DISPOSAL

Dredging/Disposal Benefits

Benefit components in this category include the receipt of federal funds for dredging operations and disposal of sediments in an approved disposal area or facility.

ENVIRONMENTAL

Benefit components in this category include general environmental benefits associated with dredging to maintain a water navigation channel, providing cost effective transportation to the area.

Environmental Benefits

- . To include the benefits from reduced emissions from oil burning generated from additional trucking or other vehicle usage.
- . To include any environmental benefits accrued to the regional ecosystem from the provision of a cleaner river and harbor due to dredging with contaminated sediments being removed and contained in one location.
- . To include the benefits of reduced air pollution through the use of alternative transportation modes.
- . To include the benefits associated with upland conservation/measures to control the impacts of siltation.
- . To include the benefits of fuel conservation due to ships transporting bulk commodities rather than rail or trucks.

#### Improve Environment

- . To include the benefits of an improved quality of life within the community due to a cleaner river and bay.
- . To include the local benefits to city neighborhoods regarding reduced trucking and railroad operations through the city.

#### Image

To include the benefits of a world class image due to port operations, such as; increased connections to other nations and the enhanced economic opportunities for the region and the Green Bay area associated with world-class port connections.

#### BUSINESS/ECONOMIC EFFECT

Benefit components in this category include the business and economic benefits of dredging as it's associated with jobs, economic development, reduced transportation costs, ship expenditures and economic impact.

#### Jobs

- . To include the direct and indirect benefits accrued to the local economy, including increased employment opportunities due to viable port operations.
- . To include the benefits to the economy through the retention and creation of jobs at the ongoing port operations, including material handling and landside port activities.

#### Economic Development

- . To include the increased economic development activities associated with port operations such as expanded markets for Wisconsin goods, economic diversification with

international markets and opportunities for tourism with the diversity of activities at the waterfront.

- . To include the benefits of retaining and expanding business and industry in the region due to the operation of an international port.
- . To include the benefits associated with the increased tax base from port landside industries and the opportunities for tax generation to the local and regional economy.
- . To include the benefits associated with the continuity and stability of long-term port operations in attracting new business and industry and the expansion of existing business and industry in the area.
- . To include the revenues generated through the economic multipliers associated with port operations.
- . To include expenditures of the shipping company and crew while docked in port.

#### Reduced Transportation

- . To include the savings derived from commercial shipping of bulk materials versus other modes of transportation.
- . To include the tax benefit derived from storage of in-transit materials.
- . To include the savings due to the efficient receipt and shipment of bulk cargos utilizing water transportation.
- . To include the benefits of increased transportation alternatives to business and industry through competitive rate structures.

- . To include the business and economic benefits attributable to direct access to water transportation and international markets through foreign trade opportunities, as it relates to forestry and pulping operations.

#### RECREATION BENEFITS

Benefit components grouped into this category include those associated with recreational opportunities related to commercial port operations.

##### Opportunities

- . To include the aesthetic benefits to residents and visitors and community business and industry.
- . To include the economic benefits to the tourism/recreation industry through increased diversity of tourist attractions and activities such as possible increased recreation boat dockage utilizing existing waterfront infrastructure.

##### Dredging

- . To include the economic benefits associated with future uses of an environmentally sound CDF for recreational land uses.

##### Cultural

- . To include the benefit of cultural exposure to foreign crew members and visual aesthetics of foreign ships in port.

#### PUBLIC/PRIVATE INFRASTRUCTURE

This category includes the benefits associated with the existing public and private infrastructure that are necessary for port operations.



### Infrastructure

- . To include the benefits of utilizing an existing infrastructure system such as sewer, water, highways, rail, power, et al. versus constructing an alternative infrastructure system if port operations are relocated.

### Stability

- . To include the benefits of an existing water transportation infrastructure which interfaces with rail and highways, and the benefits of continuity and stability upon the local and regional public and private infrastructure investments.

### Other Mode

- . To include the benefits of reduced wear and tear on the highway and rail infrastructure system due to the use of commercial shipping.

### Area

- . To include the benefits of land required of harbor operations versus the additional land needs associated with rail, highway, and private storage needed.

### Safety

- . To include the benefits of the increased safety of water transportation operations versus that of other modes.



## APPENDIX A

## Harbor Study Steering Committee

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APPENDIX B

Harbor Study Cost/Benefit Components  
January 1989  
Group I

Costs	Points
1. Dredging to maintain channel / Annual	22
2. Disposal costs / Sediment assumed a solid waste	11
3. Containment costs	7
5. Greater length of shipping season	5
Opening of shipping lanes-ice	
33. Final costs presented as costs per work hour in terms of: public taxes needed to support the alternative forms of trans.	5
18. Fed./State regs.	4
9. Environmental Costs	4
10. Supporting transportation systems	4
22. Potential environmental damage(s)	3
4. Bridge costs / Hwy & R.R.	3
23. Costs to--public/private	3
12. Difference between upland & inwater disposal/ Licensed & unlicensed Wis. Waste Mgt. Fund	3
8. Cost to maintain Hrb. Comm./Port Director	3
7. Wildlife health impacts	2
28. Costs Constr./maint. of pub. marinas/rec. facilities	2
34. Costs of updating bulkheads/breakwaters (Shore Protection)	2
42. Use of city space - Upland site	2
36. Neg. athestics / Dredge sites & dredging activity	1
25. Extra costs of energy to remote sites	1
14. Community costs/.re. CDF maint./oper.	1
35. Destruction - habitat wildlife	1
24. Labor costs - Seasonal employment/unempl. costs	1
27. Add'l pollution disposal at remote sites	
16. Storm damage to CDF/costs	
6. Veh/Rail traffic interruptions	
15. Lost opportunity costs	
26. Competition for dredge spoil disposal - Private/Remedial Action	
13. Watershed facilities/dockage	
19. Costs oper./maint./costs New work	
37. Neg. impacts on rec. activities	
30. Alt. Hrbs. - initial investments vs. long term costs	
38. Human health impacts	
32. Sediment disposal, quantity of material at alt. hrbs that needs to be contained	
39. Increased air pollution through evaporation of containments-dredge sites/pollutants & disposal sites	
21. Property valuations	
40. Neg. impacts on trking & rail workers / underutilized	
29. COE plan/management costs	
41. Ship sizes - values on various ship options	
17. Dock handling facilities	
31. Hrb. mgt costs - Loc. community infra-structure	
20. Road costs for handling dredge material	

- 11. Cost of engineering & permitting
- 43. Use of city space - Storage bulk commodities - prior to transport

Benefits	Points
3. Reduced production costs, improved competitiveness	14
5. Industrial expansion - Healthy port	10
1. Lower cost water trans. bulk commodities	9
9. Increased employment opportunities	7
2. Competition between different trans. with a harbor	7
14. Improve environmental / Quality of life	6
10. Access to international mrkts/compete with ocean ports	5
12. Infra-structure already in place	5
7. Aesthetic desire of residents	4
19. Recreational opportunities/Water oriented	4
4. Increased tax base - Community	4
11. Opportunities for tourists/diversity	3
13. Eliminate wear & tear on roads/R.R. systems	3
25. Clean up river/hrb. - put into one spot	3
27. Less property required with harbor	2
17. Improve safety	1
16. Interface with rail/Hwy	1
18. Taxing impact	1
28. Tax benefit stored-intransit materials	1
15. Conservation of fuel	
20. Conservation / Impact of silting & controls (Pressure to control)	
26. Forestry/pulping operations	
22. CDF - Economic opportunities	
8. Reduced air pollution	
24. Neigh. benefit - re. trks/rail travel	
23. Eliminates need to install/maintain equip. handling items	
21. Economic diversification	
6. Ship expenditures in port	
29. Additional jobs - Material handling - because of port	

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Harbor Study Cost/Benefit Components  
January 1989  
Group II

Costs	Points
1. Dredging/ Disposal/ Direct costs of	41
2. Structural maintenance of port facilities -	28
Dockwalls - Breakwaters	
Public infra-structure development costs - sewer, water, road	
Lift bridges maintenance and development costs	
Access roads & rail maintenance	
17. Environmental impact costs	17
3. Admin. Costs of Port/State/Local/Regional agencies -	10
Mrking, promotion costs	
8. Navigational items	7
11. Reduction of industrial, municipal waste load allocations	7
21. Opportunity costs	4
14. Port operating equipment/maintenance	4
10. Storage cost - Bulk commodities	1
12. Erosion & flooding control structures	1
13. Delay costs to motorists when bridge is open	
18. Cost of special bridge construction	
19. Property value decline	
15. Trans-shipment costs	
20. Fuel & energy consumption	
16. Social Costs	
17. Ground water Degredation	

Benefits	Points
13. Increased economic development	20
8. Retention & expansion of business	18
15. Reduced emissions from oil burning/ Positive impact on environment	16
3. Cost efficient receipt of bulk cargos	14
2. Jobs	12
9. Reduced rates on other modes of transportation/ electric / consumer	11
5. Benefits of continuity/stability	10
4. Tax generator	5
10. Accomodate recreational interests	5
12. Enhanced regional power to Green Bay/Area - image	4
14. Reduced wear & tear on highways & rail	2
16. Expanded markets for Wisc. goods	2
11. Receipt of federal \$	1
6. Increased competitiveness of benefitting business'	
7. Cultural exposure opportunities from foreign crews/ Asthetics	

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Harbor Study Cost/Benefit Components  
January 1989  
Group III

Costs	Points
1. Dredging	24
5. Construction siting and maintenance of disposal sites	18
3. Disposal of dredged	15
11. Employment impacts	12
19. Alternative transportation cost if port has to close because dredging cannot be done. e.g. Contaminated sediments must be left in place	6
4. Decrease in commodity flows w/o dredging	6
15. Cost of removal decontamination and disposal of existing contaminated sediments to allow for long-term port operations	5
8. Harbor promotion	4
12. Loss of fish and wildlife habitat	3
10. Infra-structure costs for bridges, docks, trans. facilities	3
13A. Loss of recreational sites such as Bay Beach	2
22. Cost to develop alternate ports	2
6. Bulkhead repair/replacement	2
2. Hydraulic vs. Conventional mechanical	2
14. Loss of competition among transportation alternatives	1
16. Enforcement costs	
7. Environmental impacts of resuspension of contaminants	
20. Loss of export and import opportunities	
17. Traffic impediments	
13. Future harbor development. e.g. study costs	
18. Impact on national distribution system	
21. Possible loss to commercial fishing ind. due to loss of fish habitat if open H2O disposal or additional in H2O sites are used for dredged material.	
9. Cost of local government for disposal sites	
Benefits	Points
3. Jobs - direct and indirect	26
1. Commercial shipping	16
4. Economic multipliers of port	15
9. Retention and creation of jobs	13
5. Recreation/tourism associated with harbor Recreational Boating Dockage	9
8. Increase tax base	6
12. Image - world class, connection to the world	6
2. Dredging projects provide recreational opp.	6
6. Competition	5
11. Foreign trade opportunities	2
10. Reduction of manufacturing costs due to shipping	1
13. Benefits to environment due to removal of contaminated sediments	

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Harbor Study Cost Components  
January 1989

Group	Costs	Points
II.	1. Dredging/ Disposal/ Direct costs of	41
II.	2. Structural maintenance of port facilities - Dockwalls - Breakwaters Public infra-structure development costs - sewer, water, roads Lift bridges maintenance and development costs Access roads & rail maintenance	28
III.	1. Dredging	24
I.	1. Dredging to maintain channel / Annual	22
III.	5. Construction siting and maintenance of disposal sites	18
II.	17. Environmental impact costs	17
III.	3. Disposal of dredged	15
III.	11. Employment impacts	12
I.	2. Disposal costs / Sediment assumed a solid waste	11
II.	3. Admin. Costs of Port/State/Local/Regional agencies - Mking, promotion costs	10
II.	11. Reduction of industrial, municipal waste load allocations	7
I.	3. Containment costs	7
II.	8. Navigational items	7
III.	4. Decrease in commodity flows w/o dredging	6
III.	19. Alternative transportation cost if port has to close because dredging cannot be done. e.g. Contaminated sediments must be left in place	6
III.	15. Cost of removal decontamination and disposal of existing contaminated sediments to allow for long-term port operations	5
I.	33. Final costs presented as costs per work hour in terms of: public taxes needed to support the alternative forms of trans.	5
I.	5. Greater length of shipping season Opening of shipping lanes - ice	5
I.	18. Fed./State regs.	4
I.	9. Environmental Costs	4
II.	21. Opportunity costs	4
I.	10. Supporting transportation systems	4
II.	14. Port operating equipment/maintenance	4
III.	8. Harbor promotion	4
I.	4. Bridge costs / Hwy & R.R.	3
III.	12. Loss of fish and wildlife habitat	3
I.	8. Cost to maintain Hrb. Comm./Port Director	3
I.	23. Costs to--public/private	3
I.	22. Potential environmental damage(s)	3
III.	10. Infra-structure costs for bridges, docks, trans. facilities	3
I.	12. Difference between upland & inwater disposal/ Licensed & unlicensed Wis. Waste Mgt. Fund	3
III.	6. Bulkhead repair/replacement	2
I.	28. Costs Constr./maint. of pub. marinas/rec. facilities	2
III.	13A. Loss of recreational sites such as Bay Beach	2

I.	34.	Costs of updating bulkheads/breakwaters	2
III.	2.	Hydraulic vs. Conventional mechanical	2
III.	22.	Cost to develop alternate ports	2
I.	7.	Wildlife health impacts	2
I.	42.	Use of city space - Upland site	2
I.	14.	Community costs/ re. CDF maint./oper.	1
II.	12.	Erosion & flooding control structures	1
I.	35.	Destruction - habitat wildlife	1
I.	24.	Labor costs - Seasonal employment/unempl. costs	1
I.	36.	Neg. aesthetics / Dredge sites & dredging activity	1
I.	25.	Extra costs of energy to remote sites	1
II.	10.	Storage cost - Bulk commodities	1
III.	14.	Loss of competition among transportation alternatives	1
I.	11.	Cost of engineering & permitting	
I.	38.	Human health impacts	
I.	30.	Alt. Hrbs. - initial investments vs. long term costs	
I.	20.	Road costs for handling dredge material	
I.	37.	Neg. impacts on rec. activities	
I.	17.	Dock handling facilities	
I.	19.	Costs oper./maint./costs New work	
II.	13.	Delay costs to motorists when bridge is open	
I.	13.	Watershed facilities/dockage	
II.	19.	Property value decline	
I.	26.	Competition for dredge spoil disposal - Private/Remedial Action	
II.	20.	Fuel & energy consumption	
I.	15.	Lost opportunity costs	
II.	17.	Ground water Degredation	
I.	6.	Veh/Rail traffic interruptions	
I.	40.	Neg. impacts on trking & rail workers / underutilized	
I.	16.	Storm damage to CDF/costs	
I.	39.	Increased air pollution through evaporation of containments-dredge sites/pollutants & disposal sites	
I.	27.	Add'l pollution disposal at remote sites	
I.	43.	Use of city space - Storage bulk commodities - prior to transport	
III.	16.	Enforcement costs	
I.	41.	Ship sizes - values on various ship options	
III.	7.	Environmental impacts of resuspension of contaminants	
II.	15.	Trans-shipment costs	
III.	20.	Loss of export and import opportunities	
I.	29.	COE plan/management costs	
III.	17.	Traffic impediments	
I.	32.	Sediment disposal, quantity of material at alt. hrbs that needs to be contained	
III.	13.	Future harbor development. e.g. study costs	
II.	18.	Cost of special bridge construction	
III.	18.	Impact on national distribution system	
I.	21.	Property valuations	
II.	16.	Social Costs	
I.	31.	Hrb. mgt costs - Loc. community infra-structure	
III.	21.	Possible loss to commercial fishing ind. due to loss of fish habitat if open H2O disposal or additional in H2O sites are used for dredged material.	
III.	9.	Cost of local government for disposal sites	

Harbor Study Benefit Components  
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Group	Benefits	Points
III.	3. Jobs - direct and indirect	26
II.	13. Increased economic development	20
II.	8. Retention & expansion of business	18
III.	1. Commercial shipping	16
II.	15. Reduced emissions from oil burning/ Positive impact on environment	16
III.	4. Economic multipliers of port	15
II.	3. Cost efficient receipt of bulk cargos	14
I.	3. Reduced production costs, improved competitiveness	14
III.	9. Retention and creation of jobs	13
II.	2. Jobs	12
II.	9. Reduced rates on other modes of transportation/ electric / consumer	11
I.	5. Industrial expansion - Healthy port	10
II.	5. Benefits of continuity/stability	10
I.	1. Lower cost water trans. bulk commodities	9
III.	5. Recreation/tourism associated with harbor Recreational boating dockage	9
I.	9. Increased employment opportunities	7
I.	2. Competition between different trans. with a harbor	7
III.	2. Dredging projects provide recreational opp.	6
III.	12. Image - world class, connection to the world	6
I.	14. Improve environmental / Quality of life	6
III.	8. Increase tax base	6
II.	4. Tax generator	5
II.	10. Accomodate recreational interests	5
III.	6. Competition	5
I.	12. Infra-structure already in place	5
I.	10. Access to international mrkts/compete with ocean ports	5
I.	4. Increased tax base - Community	4
I.	19. Recreational opportunities/Water oriented	4
I.	7. Aesthetic desire of residents	4
II.	12. Enhanced regional power to Green Bay/Area - image	4
I.	25. Clean up river/hrb. - put into one spot	3
I.	13. Eliminate wear & tear on roads/R.R. systems	3
I.	11. Opportunities for tourists/diversity	3
II.	14. Reduced wear & tear on highways & rail	2
II.	16. Expanded markets for Wisc. goods	2
I.	27. Less property required with harbor	2
III.	11. Foreign trade opportunities	2
I.	16. Interface with rail/Hwy	1
II.	11. Receipt of federal \$	1
I.	18. Taxing impact	1
I.	28. Tax benefit stored-intransit materials	1
I.	17. Improve safety	1
III.	10. Reduction of manufacturing costs due to shipping	1
I.	29. Additional jobs - Material handling - because of port	
I.	8. Reduced air pollution	
II.	7. Cultural exposure opportunities from foreign crews/ Aesthetics	
I.	22. CDF - Economic opportunities	

- I. 6. Ship expenditures in port
- I. 26. Forestry/pulping operations
- I. 23. Eliminates need to install/maintain equip. handling items
- I. 20. Conservation / Impact of silting & controls  
(Pressure to control)
- II. 6. Increased competitiveness of benefitting business"
- I. 24. Neigh. benefit - re. trks/rail travel
- I. 21. Economic diversification
- I. 15. Conservation of fuel
- III. 13. Benefits to environment due to removal of contaminated  
sediments

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APPENDIX C

## HARBOR STUDY COST COMPONENTS

### Dredging/Disposal A

Dredging/Disposal/Direct costs of  
Dredging  
Dredging to maintain channel/Annual  
Construction siting and maintenance of disposal sites  
Disposal of dredged  
Disposal costs/Sediment assumed a solid waste  
Containment costs  
Cost of removal decontamination and disposal of existing  
contaminated sediments to allow for long-term port operations  
Cost of local government for disposal sites  
Difference between upland & inwater disposal/Licensed &  
unlicensed Wis. Waste Mgt. Fund  
Hydraulic vs. Conventional mechanical  
Use of city space - Upland site  
Extra costs of energy to remote sites  
Cost of engineering and permitting  
Costs oper./maint./costs New work  
Road costs for handling dredge material  
Competition for dredge spoil disposal - Private/Remedial Action  
COE plan/management costs  
Sediment disposal, quantity of material at alt. hrbs that need  
to be contained

Long Term Care/Disposal Facility B  
Community costs re CDF maint/oper.  
Storm Damage to CDF/costs

Legal aspects/Fed/State/Local C  
Fed/State Regs  
Enforcement Costs

## HARBOR STUDY COST COMPONENTS

### ENVIRONMENTAL

#### COSTS: A

- Environmental impact costs
- Enforcement costs
- Potential environmental damage (s)
- Environmental costs
- Add'l pollution disposal at remote sites

#### WILDLIFE: B

- Loss of fish and wildlife habitat
- Destruction - habitat wildlife
- Wildlife health impacts

#### FEDERAL/STATE ENFORCEMENT: C

- Reduction of industrial, municipal waste load allocations
- Fed./State regs.
- Ground Water Degradation
- Increased air pollution through evaporation of contaminants-dredge sites/pollutants & disposal sites
- Environmental impacts of resuspension of contaminants
- Possible loss to commercial fishing industry due to loss of fish habitat if open H2O disposal or additional in H2O sites are used for dredged material

#### SOCIAL COSTS: D

- Human health impacts
- Social costs

#### SEASON: E

- Greater length of shipping season
- Opening of shipping lanes - ice

#### CDF COST: F

- Storm damage to CDF/costs

### BUSINESS/ECONOMIC EFFECT

#### EMPLOYMENT: A

- Employment impacts
- Labor Costs - Seasonal employment/unemployment costs
- Negative impacts on trucking/rail workers/underutilized



WATER QUALITY: B

Reduction of industrial, municipal waste load  
allocations

Possible loss to commercial fishing industry due to  
loss of fish habitat if open H2O disposal or  
additional in H2O sites are used for dredged  
material

ENFORCEMENT COSTS: C

Enforcement Costs  
Federal/State reg.

ALTERNATE PORT COSTS: D

Decrease in commodity flows w/o dredging  
Alternative transportation cost if port has to close  
because dredging cannot be done.  
e.g. Contaminated sediments must be left in place  
Final costs presented as costs per work hour in terms  
of: public taxes needed to support the  
alternative forms of transportation  
Opportunity costs  
Storage cost - Bulk commodities  
Loss of competition among transportation alternatives  
Alt. Hrbs - initial investments vs. long term costs  
Cost to develop alternate ports  
Fuel & energy consumption  
Lost opportunity costs  
Use of city space - Storage bulk commodities - prior  
to transport  
Trans-shipment costs  
Loss of export and import opportunities  
Ship sizes - values on various ship options

PORT PROMOTION: E

Admin. Costs of Port/State/Local/Regional agencies -  
Marketing, promotion costs  
Harbor promotion

NATIONAL SYSTEM IMPACT: F

Impact on national distribution system

SOCIAL COST: G

Social Costs

RECREATION

CONSTRUCTION COST: A

Cost Constr./maint. of pub. marinas/rec. facilities

ENFORCEMENT COST: B

Enforcement Costs  
Fed./State regs.

LOST OPPORTUNITY COST: C

Lost opportunity costs  
Loss of recreational sites such as Bay Beach  
Neg. aesthetics / Dredge sites & dredging activity  
Neg. impacts on rec. activities

OPPORTUNITY COST: D

Opportunity costs

SOCIAL COST: E

Social costs

PUBLIC/PRIVATE INFRASTRUCTURE

FACILITY COSTS: A

Supporting transportation systems  
Port operating equipment/maintenance  
Costs to--public/private  
Bridge costs / Hwy & R.R.  
Infra-structure costs for bridges, docks, trans.  
facilities  
Bulkhead repair/replacement  
Delay costs to motorists when bridge is open  
Erosion & flooding control structures  
Costs of updating bulkheads/breakwaters  
Dock handling facilities  
Waterside facilities/dockage  
Navigational items  
Veh/Rail traffic interruptions  
Traffic impediments  
Cost of special bridge construction  
Structural maintenance of port facilities - Dockwalls  
- Breakwaters  
Public infra-structure development costs - sewer,  
water, roads  
Lift bridges maintenance and development costs  
Access roads & rail maintenance

ALTERNATE PORT COST: B

Final costs presented as costs per work hour in terms  
of: public taxes needed to support the  
alternative forms of trans.  
Alt. Hrbs. - initial investments vs. long term costs  
Cost to develop alternate ports  
Future harbor development. e.g. study costs

PROPERTY ASSESSMENT: C

Property value decline  
Opportunity costs  
Property valuations

PORT PROMOTION: D

Cost to maintain hrb. Comm./Port Director  
Hrb. mgt. costs - Loc. community infra-structure

ENFORCEMENT COSTS: E

Fed./State regs.  
Enforcement costs

USE OF CITY LAND: F

Road costs for handling dredge material  
Use of city space - Upland site

LENGTH OF SEASON: G

Greater length of shipping  
Opening of shipping lanes - ice

LOST OPPORTUNITY: H

Lost opportunity costs

## HARBOR STUDY BENEFIT COMPONENTS

### BENEFITS

#### DREDGING/DISPOSAL

DREDGING/DISPOSAL: A

Receipts of federal \$

#### ENVIRONMENTAL

ENVIRONMENTAL BENEFITS: A

Reduced emissions from oil burning/  
Positive impact on environment  
Clean up river/hrb. - put into one spot  
Reduced air pollution  
Conservation / Impact of silting & controls  
(Pressure to control)  
Conservation of fuel  
Benefits to environment due to removal of  
contaminated sediments

IMPROVE ENVIRONMENT: B

Improve environmental / Quality of life  
Neigh. benefit - re. trks/rail travel

IMAGE: C

Image - world class, connection to the world  
Enhanced regional power to Green Bay/Area - image

#### BUSINESS/ECONOMIC EFFECT

JOBS: A

Increased employment opportunities  
Jobs - direct and indirect  
Retention and creation of jobs  
Jobs  
Additional jobs - Material handling - because of port

ECONOMIC DEVELOPMENT: B

Increased economic development  
Retention & expansion of business  
Increase tax base  
Taxing impact  
Industrial expansion - Healthy port  
Benefits of continuity/stability  
Increase tax base  
Tax generator  
Increased tax base - Community  
Opportunities for tourists/diversity  
Expanded markets for Wisc. goods  
Economic diversification

REDUCED TRANSPORTATION COST: C

- Image - world class, connection to the world
- Conservation of fuel
- Commercial shipping
- Competition between different trans. with a harbor
- Tax benefit stored-intransit materials
- Cost efficient receipt of bulk cargos
- Reduced production costs, improved competitiveness
- Reduced rates on other modes of transportation/  
electric/consumer
- Lower cost water trans. bulk commodities
- Competition
- Access to international mrkts/compete with ocean  
ports
- Forestry/pulping operations
- Increased competitiveness of benefitting business
- Foreign trade opportunities
- Reduction of manufacturing costs due to shipping

SHIP EXPENDITURES: D

- Ship expenditures in port

ECONOMIC IMPACT: E

- Economic multipliers of port

IMAGE: F

- Enhanced regional power to Green Bay/Area - image

RECREATION

OPPORTUNITIES: A

- Recreational opportunities/Water oriented
- Aesthetic desire of residents
- Accommodate recreational interests
- Opportunities for tourists/diversity
- CDF - Economic opportunities
- Recreation/tourism associated with harbor
- Recreational boating dockage

DREDGING: B

- Dredging projects provide recreation opp.

CULTURAL AESTHETICS: C

- Cultural exposure opportunities from foreign crews/  
Aesthetics

PUBLIC/PRIVATE INFRASTRUCTURE

INFRASTRUCTURE: A

Infra-structure already in place  
Interface with rail/Hwy  
Reduced wear & tear on highways & rail

BENEFITS/STABILITY: B

Benefits of continuity/stability

FEDERAL DOLLARS: C

Receipt of federal \$

OTHER MODE UPKEEP: D

Eliminates need to install/maintain equip. handling  
items  
Eliminate wear & tear on roads/R.R. systems

AREA REQUIRED: E

Less property required with harbor

SAFETY: F

Improve safety

BAY-LAKE REGIONAL PLANNING COMMISSION

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